

Human activity recognition in artificial intelligence framework: a narrative review

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Abstract

Human activity recognition (HAR) has multifaceted applications due to its worldly usage of acquisition devices such as smartphones, video cameras, and its ability to capture human activity data. While electronic devices and their applications are steadily growing, the advances in Artificial intelligence (AI) have revolutionized the ability to extract deep hidden information for accurate detection and its interpretation. This yields a better understanding of rapidly growing acquisition devices, AI, and applications, the three pillars of HAR under one roof. There are many review articles published on the general characteristics of HAR, a few have compared all the HAR devices at the same time, and few have explored the impact of evolving AI architecture. In our proposed review, a detailed narration on the three pillars of HAR is presented covering the period from 2011 to 2021. Further, the review presents the recommendations for an improved HAR design, its reliability, and stability. Five major findings were: (1) HAR constitutes three major pillars such as devices, AI and applications; (2) HAR has dominated the healthcare industry; (3) Hybrid AI models are in their infancy stage and needs considerable work for providing the stable and reliable design. Further, these trained models need solid prediction, high accuracy, generalization, and finally, meeting the objectives of the applications without bias; (4) little work was observed in abnormality detection during actions; and (5) almost no work has been done in forecasting actions. We conclude that: (a) HAR industry will evolve in terms of the three pillars of electronic devices, applications and the type of AI. (b) AI will provide a powerful impetus to the HAR industry in future.